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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/743,299

12/23/2003

Takeo Kanade

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SQUIRE, SANDERS & DEMPSEY L.L.P.
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EXAMINER

TUCKER, WESLEY J

ART UNIT

PAPER NUMBER

2624

MAIL DATE

DELIVERY MODE

02/06/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/743,299	Applicant(s) KANADE ET AL.	
	Examiner WESLEY TUCKER	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed November 25th 2008 has been entered and made of record.
2. Applicant has amended claims 1-15. Claims 1-15 are pending.
3. Applicant's remarks in view of the presented amendments have been fully considered but are not found to be persuasive for at least the following reasons:

Applicant argues that the reference to Haikawa does not disclose the claimed feature of selecting a predetermined region. Examiner disagrees. When Haikawa discloses screening the shapes in an image to determine the candidate shape points, this is interpreted as a predetermined region. The region to be evaluated is determined from the screening of the image scene. Applicant further argues that Haikawa does not disclose that a range image is obtained based on the selected region as claimed. Examiner strongly disagrees. Haikawa discloses explicitly determining "the distance between the robot and each shape feature point." The distance between the feature points of the predetermined region and the robot is range directly determined by the image data. Applicant further argues that Haikawa does not disclose recognition of polyhedron shapes based on the range image within a candidate range. Examiner again disagrees. Haikawa explicitly discloses that the polyhedron shapes or staircases are determined along with the range or distance to them (column 6, lines 9-23). This reads on recognizing polyhedrons in the candidate range. The range is interpreted to

be a candidate range as it is determined from candidate points defining the object of interest or predetermined region.

The Haikawa patent is directed to the exact same endeavor as the present application, namely a robot with staircase recognition and range finding capabilities. Haikawa is interpreted to read on the claim language. The rejection is therefore maintained and accordingly made FINAL.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 5, 8, 12 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,378,969 to Haikawa.

With regard to claim 1, Haikawa discloses ***a system for recognizing shape of a staircase or other polyhedron based on an image input from photographic means, comprising:***

at least one camera as the photographic means (Fig. 1, element 32),

region selection means for selecting a predetermined region to be processed further for detailed analysis within the image photographed by the at least one camera (column 5, lines 52-67 and column 6, lines 1-9, Haikawa discloses that features points are found for the whole image and then optimum feature points are ranked and further analyzed, while other candidate points are discarded.),

processing region setting means for obtaining a range image from the image obtained by the at least one camera and for setting a processing region upon the obtained range image based on the selected region (column 6, lines 9-24, Haikawa disclose that the distances or ranges between the robot and the feature points is are calculated), ***and***

polyhedron shape recognition means for recognizing the shape of the one or more polyhedrons based on the range image within the set candidate range (Fig. 8 and column 6, lines 9-23, Haikawa discloses recognizing and analyzing a staircase or polyhedron from the image data of the captured environment).

With regard to claim 5, Tatsuto discloses ***a system according to claim 1, wherein the polyhedron shape recognition means is configured to extract sets of points constituting the range image within the processing region as sets of range data in a three-dimensional space and recognizes the shape of said polyhedron based on the extracted sets of points*** (column 5, lines 52-67 and column 6, lines 1-23).

With regard to claim 8, the discussion of claim 1 applies. Haikawa discloses the method of claim 8 in the discussion of the operation of the system of claim 1.

With regard to claim 12, the discussion of claim 5 applies.

With regard to claim 15, the discussions of claims 1 and 8 apply. Haikawa discloses a computer system (Fig. 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2-4, 6-7, 9-11, and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of U.S. Patent 5,378,969 to Haikawa, and Japanese Patent 3,192,736 to Tatsuto cited by applicant. A machine translation has been included in the file and has been relied on to disclose certain claimed features.

With regard to claim 2, Haikawa discloses a system according to claim 1, and discloses determining features of interest and their range as discussed above with

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regard to claim 1. Haikawa only uses one camera and does not disclose using two cameras. It is well known in the art to use dual camera in 3D applications to determine depth through stereoscopy. Tatsuto is directed to the very same problem as Haikawa and discloses ***wherein the photographic means comprises at least two cameras*** (paragraph [0009] and Fig. 1, elements 36), ***and the region selection means is configured to select the predetermined region within the image photographed by one of the at least two cameras*** (paragraph [0012]), ***and the processing region setting means is configured to obtain the range image from the image obtained stereoscopically from the at least two cameras*** (paragraphs [0019]-[0021]).

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use two cameras as taught by Tatsuto, instead of the single camera taught by Haikawa in order to calculate 3D range data through stereoscopy.

With regard to claim 3, Haikawa discloses a system according to claim 1, but does not disclose ***wherein the region selection means is configured to extract groups of line segments that are longer than a predetermined length from within the photographed image, and to select the predetermined region based on positions of the extracted groups of line segments***. Tatsuto discloses this feature (paragraph [0020]). Tatsuto discloses determining if a quadrilateral is below a certain threshold or if the edges are not of a certain defining length, that the quadrilateral is actually noise and is disregarded in the staircase calculations. Tatsuto and Haikawa

are directed to solving the exact same problem and are therefore combinable in this technique.

With regard to claim 4, Tatsuto discloses ***wherein the region selection means is configured to select the predetermined region based on the positions of groups of line segments that are parallel to each other within the extracted groups of line segments, wherein the groups of line segments are sufficiently close in distance*** (Figs. 10-12).

With regard to claim 6, Tatsuto discloses ***wherein the polyhedron is a staircase and the polyhedron shape recognition means are configured to assume the extracted set of points to be an inclined plane, and to recognize the shape of said staircase by finding an approximate plane*** (Figs. 6-8 and 10-12).

With regard to claim 7, Tatsuto discloses ***wherein the polyhedron is a staircase and the polyhedron shape recognition means is configured to section the extracted set of points along vertical planes, and to recognize the shape of the staircase based on an error between sets of points on cross-sectional planes and a two-dimensional model*** (paragraphs [0020]-[0021]).

With regard to claims 9-11, the discussion of claims 2-4 apply respectively.

With regard to claims 13-14, the discussion of claims 6-7 apply respectively.

FINAL REJECTION

6. Applicant's amendment necessitated the grounds of rejection presented in the Office Action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to WESLEY TUCKER whose telephone number is (571)272-7427. The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Bella can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Wes Tucker/
Examiner, Art Unit 2624